

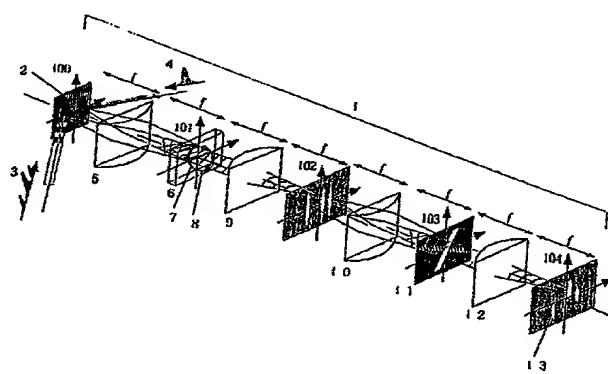
PCT

特許協力条約に基づいて公開された国際出願

(51) 国際特許分類7 G02F 1/37	A1	(11) 国際公開番号 WO00/58784
		(43) 国際公開日 2000年10月5日(05.10.00)
(21) 国際出願番号 PCT/JP00/01816		(81) 指定国 US, 欧州特許 (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE)
(22) 国際出願日 2000年3月24日(24.03.00)		添付公開書類 国際調査報告書
(30) 優先権データ 特願平11/83905 1999年3月26日(26.03.99) JP		
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(54) Title: METHOD FOR EXTRA-HIGH SPEED TRANSFORMATION OF TIME SIGNAL INTO TWO-DIMENSIONAL SPACE SIGNAL

(54) 発明の名称 時間信号の2次元空間信号への超高速変換方法



(57) Abstract

A signal light pulse to be transformed into a two-dimensional space signal and a reference extra-short light pulse are directed to a dispersion device (2). One-dimensional frequency light distributions produced by a one-dimensional Fourier transformation lens (5) are made to enter a nonlinear crystal (6) to form a 2nd-harmonic. The light wave distribution produced by subjecting the 2nd-harmonic to time-space transformation through the one-dimensional Fourier transformation lens (9) is filtered by a time-frequency filter (11) provided on the filter surface (102) of a one-dimensional space frequency filtering optical system and transformed into a two-dimensional space signal (13) corresponding to the two-dimensional light distribution which is time-frequency-developed and which represents the relation between the time and frequency of the signal light pulse. Thus, a specific technique of realizing extra-high speed transformation of a signal form from a time signal into a two-dimensional space signal without necessity of active scanning and displaying the 2-dimensional signal in a visible region in a temporally steady state is provided.

ABSTRACT

A signal light pulse to be converted into a two-dimensional space signal and a reference ultra-short light pulse are directed to a dispersion device 2, a second-harmonic is generated by introducing an one-dimensional frequency light distribution obtained by an one-dimensional Fourier transform lens 5, the second-harmonic is then subjected to time-to-space conversion through an one-dimensional Fourier transform lens so as to obtain a light wave distribution, and the light wave distribution is then subjected to filtering by a time-frequency filter 11 provided on a filter plane 102 of an one-dimensional space frequency filtering optical system and is further converted into a two-dimensional space signal 13 corresponding to a time-frequency expanded two-dimensional light distribution which represents a relation between time and frequency of the signal pulse light. Thereby, there is provided a specific technique of realizing ultra-fast conversion of signal form from time signal into two-dimensional space signal without any active-scan and also displaying the two-dimensional signal in a visible region with a temporally steady state.